

curing the preform having the applied untoughened resin to produce the at least one toughened region and the at least one untoughened region wherein the toughened region comprises a toughened resin having a fracture toughness of at least about $1.0 \text{ MPa}\cdot\text{m}^{1/2}$.

2. The method of claim 1 wherein the toughening agent is selected from the group consisting of polymers, nano fibers, nano particles, and combinations thereof.

3. The method of claim 1 wherein the material is selected from the group consisting of carbon fiber, glass fiber, ceramic fiber, graphite fiber, aramid fiber, and combinations thereof.

4. The method of claim 1 wherein the untoughened resin is a resin selected from the group consisting of vinyl ester resins, polyester resins, acrylic resins, epoxy resins, polyurethane resins, bismaleimide resins, polyimide resins, and combinations thereof.

5. The method of claim 1 wherein applying the toughening agent comprises joining the toughening agent to the material such that when the untoughened resin is applied the toughened resin is produced in the portion of the material comprising the toughening agent.

6. The method of claim 1 wherein applying the toughening agent comprises combining the toughening agent with the untoughened resin to produce a toughened resin and applying the toughened resin to the portion of the material.

7. The method of claim 1 wherein the article is a turbine engine component selected from the group consisting of fan casings and airfoils.

8. The method of claim 1 further comprising a transition region between each toughened region and untoughened region.

9. The method of claim 1 wherein the toughened region corresponds to the portion of the material comprising the toughening agent.

10. The method of claim 1 further comprising coupling at least one toughened flange to the at least one toughened region wherein the toughened flange is selected from the group consisting of mounting flanges, attachment end flanges, and combinations thereof.

11. The method of claim 1 wherein applying the toughening agent comprises spraying the toughening agent on the material such that when the untoughened resin is applied the toughened resin is produced in the portion of the material comprising the toughening agent.

12. The method of claim 1 wherein the untoughened region of the article comprises an impact zone.

13. The method of claim 6 wherein the toughened resin comprises from about 5% to about 20% by weight of the toughening agent.

14. A method of making an article having at least one toughened region and at least one untoughened region comprising:

- providing a material;
- applying a toughening agent to a portion of the material;
- shaping the material to produce a preform;
- applying an untoughened resin to the preform; and
- curing the preform having the applied untoughened resin to produce the at least one toughened region and the at least one untoughened region

wherein the toughened region corresponds to the portion of the material comprising the toughening agent, the composite material comprises a transition region between each toughened region and untoughened region, and the toughened region comprises a toughened resin having a fracture toughness of at least about $1.0 \text{ MPa}\cdot\text{m}^{1/2}$.

15. The method of claim 14 wherein the toughening agent is selected from the group consisting of polymers, nano fibers, nano particles, and combinations thereof.

16. The method of claim 14 wherein each transition region is positioned in an orientation selected from the group consisting of planar, normal to the plane, and combinations thereof.

17. The method of claim 14 wherein the material is selected from the group consisting of carbon fiber, glass fiber, ceramic fiber, graphite fiber, aramid fiber, and combinations thereof.

18. The method of claim 14 wherein applying the toughening agent to a portion of the material and shaping the material occur concurrently.

19. The method of claim 14 further comprising coupling at least one toughened flange to the at least one toughened region wherein the toughened flange is selected from the group consisting of mounting flanges, attachment end flanges, and combinations thereof.

20. A method of making a fan casing having at least one toughened region and at least one untoughened region comprising:

- providing a material;
- applying a toughening agent to a portion of the material;
- shaping the material to produce a fan casing preform;
- applying an untoughened resin to the fan casing preform; and
- curing the fan casing preform having the applied untoughened resin to produce the at least one toughened region and the at least one untoughened region

wherein the toughened region corresponds to the portion of the material comprising the toughening agent and wherein the toughened region comprises a toughened resin having a fracture toughness of at least about $1.0 \text{ MPa}\cdot\text{m}^{1/2}$.

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